(Accessed 11 September 2016).

60. Wypych- Ślusarska A, Grot M, Kujawińska M, et.al. Respiratory Symptoms, Allergies, and Environmental Exposures in Children with and without Asthma. **International Journal of Environmental Research and Public Health**. 2022 Sep 6;19(18): 11180.
61. Yehya Ismail, N., Mohamed Rabie, M., AL- Awadi, I.& Gamil Twfeeq, H. (2017). Frequency Of Asthma In Children Born By Cesarean Section Compared To Those Delivered Vaginally. **Al-Azhar Medical Journal**, 46(2), 455- 462.
62. Youssef M. M., El- Din E. M. S., AbuShady M. M., et.al. (2018). Urinary bisphenol A concentrations in relation to asthma in a sample of Egyptian children. **Human& Experimental Toxicology**, 37(11), 1180- 1186.
63. Zedan, M., Settin, A., Farag, M., et.al. (2009). How do Egyptian children describe asthma symptoms. **Egyptian Journal of Bronchology**, 3(1), 74- 80.
64. Zhang C, Kong Y, Shen K. The Age, Sex, and Geographical Distribution of Self- Reported Asthma Triggers on Children With Asthma in China. **Frontiers in Pediatrics**. 2021 Sep 3; 9: 689024.
65. Zhou X, Hong J. Pediatric asthma management in China: current and future challenges. **Pediatric Drugs**. 2018 Apr; 20(2):105-10.

necrosis factor haplotypes on the development of asthma in children: an Egyptian model. **Genetic Testing and Molecular Biomarkers**, 15(5), 293- 299.

32. Kaplan A, Price D. Treatment adherence in adolescents with asthma. **Journal of asthma and allergy**. 2020;13:39.
33. Koster ES, Raaijmakers JA, Vijverberg SJ, van der Ent CK, Maitland-van der Zee AH. Asthma symptoms in pediatric patients: differences throughout the seasons. **Journal of Asthma**. 2011 Sep 1;48(7): 694-700.
34. Kutzora S, Weber A, Heinze S, et.al. Asthmatic/wheezing phenotypes in preschool children: Influential factors, health care and urban- rural differences. **International journal of hygiene and environmental health**. 2018 Mar 1;221(2): 293- 9.
35. Lawson JA, Janssen I, Bruner MW, Madani K, Pickett W. Urban-rural differences in asthma prevalence among young people in Canada: the roles of health behaviors and obesity. **Annals of Allergy, Asthma& Immunology**. 2011 Sep 1; 107(3): 220- 8.
36. LeBeau P, Lockhart A, Togias A, et.al. Cockroach- induced IL9, IL13, and IL31 expression and the development of allergic asthma in urban children. **Journal of Allergy and Clinical Immunology**. 2021 May 1; 147(5): 1974- 7.
37. Lodge CJ, Tan DJ, Lau MX, et.al. Breastfeeding and asthma and allergies: a systematic review and meta analysis. **Acta paediatrica**. 2015 Dec; 104:38- 53.
38. Long RN. Housing Characteristics, Asthma Triggers, and Asthma Outcomes: Data from the American Housing Survey. **InISEE Conference Abstracts** 2018 Sep 24 (Vol. 2018, No. 1).
39. Maciag MC, Phipatanakul W. Update on indoor allergens and their impact on pediatric asthma. **Annals of Allergy, Asthma& Immunology**. 2022 Feb 25.
40. Mansour, A. E., Yasein, Y. A., Ghandour, A., Zaidan, O.& Abo El-Abaas, M. M. (2014). Prevalence of bronchial asthma and its impact on the cognitive functions and academic achievement among preparatory school children in Damietta Governorate, Egypt. **J Am Sci**, 10(7), 119- 27.
41. Mao S, Wu L, Shi W. Prevalence and distribution patterns of allergens among children with asthma and asthma- like symptoms in Shanghai, China. **Respiratory research**. 2020 Dec; 21(1): 1- 8.
42. Meatty, E., ElDesoky, T., ElDomyaty, H., ElGilany, A.& Nasef, N. (2018). Prevalence of childhood bronchial asthma and its associated factors: a community based study in Egypt. **Prog Med Sci**, 2(2), 14-20.
43. Mohamed Hussain S, Ayesha Farhana S, Mohammed Alnasser S. Time trends and regional variation in prevalence of asthma and associated factors in Saudi Arabia: A systematic review and meta-analysis. **BioMed research international**. 2018 May 23;2018.
44. Mohammed, A. A., Mohamed, F. Y., El- Okda, E. S.& Ahmed, A. B. (2015). Blood lead levels and childhood asthma. **Indian pediatrics**, 52(4), 303- 306.
45. Mostafa, S. (2016). **Use Meta- analysis in Clinical Data, the Potentials and Limitations, "The 3rd International Public Health and Community Medicine Department, Crossing Gaps to Practice",** Faculty of Medicine, Cairo University, and WHO 21- 22.
46. Nabih, E. S., Kamel, H. F. M.& Kamel, T. B. (2016). Association between CD14 polymorphism (– 1145G/a) and childhood bronchial asthma. **Biochemical genetics**, 54(1), 50- 60.
47. Ojwang V, Nwaru BI, Takkinen HM, et.al. Early exposure to cats, dogs and farm animals and the risk of childhood asthma and allergy. Pediatric **Allergy and Immunology**. 2020 Apr; 31(3): 265- 72.
48. Olenec JP, Kim WK, Lee WM, et.al. Weekly monitoring of children with asthma for infections and illness during common cold seasons. **Journal of Allergy and Clinical Immunology**. 2010 May 1;125(5): 1001- 6.
49. Oluwole O, Rennie DC, Senthilselvan A, Dyck R, Afanasieva A, Adamko DJ, Lawson JA. Asthma diagnosis among children along an urban- rural gradient. **Journal of Asthma**. 2018 Nov 2;55(11): 1242-52.
50. Pechlivanis S, von Mutius E. Effect of Farming on Asthma. **Acta Medica Academica**. 2020 Jul 1;49(2).
51. Pignataro FS, Bonini M, Forgione A, Melandri S, Usmani OS. Asthma and gender: the female lung. **Pharmacological research**. 2017 May 1;119:384- 90.
52. Rabito FA, Werthmann D, He H, Madkour AS, Arroyave WD, Sever ML, LaVeist TA. Cockroach exposure and perceived stress interact to predict clinical outcomes in childhood asthma. **BMC Pulmonary Medicine**. 2021 Dec; 21(1): 1- 8.
53. Samra, N. M., EI- sharkawi, S. Z., Abd El- Ghany, H. M.& Mohammed, Z. T. (2009). Relationship between concentration of serum leptin and childhood asthma in Egypt. **Res J Med& Med Sci**, 4(2), 249- 56.
54. Shaaban, H., Abd El- Monem, E., Wafy, S. M.& Mousa, M. (2012). Risk factors for childhood asthma: which can be avoided? A casecontrol study. **EJB**, 6(1), 25- 36.
55. Sibi Chakravarthy K, Singh RB, Swaminathan S, Venkatesan P. Prevalence of asthma in urban and rural children in Tamil Nadu. **National Medical Journal of India**. 2002;15(5): 260- 3.
56. Subbarao P, Mandhane PJ, Sears MR. Asthma: epidemiology, etiology and risk factors. Cmaj. 2009 Oct 27;181(9): E181- 90.
57. Tageldin, M. A., Aly, G. S., Mostafa, S.& Khalil, H. (2007). Epidemiological study of risk factors in pediatric asthma. Egyptian **Journal of Pediatric Allergy and Immunology** (The), 5(1).
58. Valerio MA et.al. Examining the association between childhood asthma and parent and grandparent asthma status: implications for practice. **Clinical Pediatrics**, 2010, 49:535- 541.
59. World Health Organization (WHO): Bronchial asthma. Available via http://www.who.int/mediaCentre/factsheets/fs206/en/

study in an Egyptian university medical centre. **East Mediterr Health J**, 19(6), 520- 6.

4. Abdallah A, Sanusy K, Said W, Mahran DG, Mohamed- Hussein AA. (2012). Epidemiology of bronchial asthma among preparatory school in Assiut district. **Egypt J Pediatr Allergy Immunol**; 10(2): 109- 17.
5. Abdallah, A. M., Sanusy, K. A., Said, W. S., Mahran, D. G.& Mohamed- Hussein, A. A. (2012). Epidemiology of bronchial asthma among preparatory school children in Assiut district. **Egyptian Journal of Pediatric Allergy and Immunology**, 10:2.
6. Abdel- Baseer KA, Hammad EE, Qubaisy H, Naser MA, Ahmed AA, Said AM. Some epidemiological aspects of bronchial asthma in children in Qena Governorate, Egypt. **Immunome Research**. (2017);13(3): 1- 5.
7. Ahmad, E. E. G. E. R., Kamel, A. S., Amin, S. A.& Hashem, A. E. (2016). Epidemiology of Childhood Asthma in Fayoum City (District) Egypt. **Pharmaceutical and Biosciences Journal**, 67- 75.
8. Al Dhduh MAA, Mohamed Sabri NA, Fouda EM. (2015). Prevalence and severity of allergic diseases among Egyptian pediatric in different Egyptian areas. **Int JPharm Sci Res**; (1): 107.
9. Al Ghamdi BR, Mahfouz AA, Abdel Moneim I, Khan MY, Daffallah AA. Altitude and bronchial asthma in south- western Saudi Arabia. **EMHJ- Eastern Mediterranean Health Journal**, 14 (1), 17- 23, 2008.
10. Al- Qerem, W. A., Ling, J., Pullen, R.& McGarry, K. (2016). Reported prevalence of allergy and asthma in children from urban and rural Egypt. **Air Quality, Atmosphere& Health**, 9(6), 613- 620.
11. Burke H, Leonardi- Bee J, Hashim A, et.al. Prenatal and passive smoke exposure and incidence of asthma and wheeze: systematic review and meta- analysis. **Pediatrics**. 2012 Apr; 129(4): 735- 44.
12. Busse WW, Lemanske Jr RF, Gern JE. Role of viral respiratory infections in asthma and asthma exacerbations. **The Lancet**. 2010 Sep 4;376(9743): 826- 34.
13. Cesaroni G, Farchi S, Davoli M, Forastiere F, Perucci CA. Individual and area- based indicators of socioeconomic status and childhood asthma. **European Respiratory Journal**. 2003 Oct 1; 22(4): 619- 24.
14. D'Amato G, Holgate ST, Pawankar R, et.al. Meteorological conditions, climate change, new emerging factors, and asthma and related allergic disorders. A statement of the World Allergy Organization. **World Allergy Organization Journal**. 2015 Dec; 8(1): 1- 52.
15. DiMango E, Rogers L, Reibman J, et.al. Risk factors for asthma exacerbation and treatment failure in adults and adolescents with well-controlled asthma during continuation and step- down therapy. **Annals of the American Thoracic Society**. 2018 Aug; 15(8): 955- 61.
16. Dogaru CM, Nyffenegger D, Pescatore AM, Spycher BD, Kuehni CE. Breastfeeding and childhood asthma: systematic review and meta-analysis. **American journal of epidemiology**. 2014 May 15;179(10): 1153- 67.
17. El Sherbini, M., Ata, A.& El Sayed, S. (2016). Prevalence of asthma and other atopies among school children in Qalyubia Governorate, Egypt. **Medical Research Journal**, 15(1), 27- 33.
18. El- Aal, A., Ahemed, A., El- Nashar, M. M.& El- Sissy, A. H. (2012). Glutathione S- transferase T1 (GSTT1) and M1 (GSTM1) genes polymorphism and risk of bronchial asthma in children. **Comparative Clinical Pathology**, 21(6), 1197- 1201.
19. El- Gilany, A. H. **Prevalence and predictors of suboptimal control of childhood bronchial asthma: a community- based study in Dekerness District**, Egypt.
20. El- Mashad, G. M., Mahmoud, A. A.& Hafez, A. A. A. (2016). The prevalence of bronchial asthma among primary school children in Menoufiya Governorate (El- Bagour Center). **Menoufia Medical Journal**, 29(1), 89.
21. Elmaraghy, M. A., Hodieb, M. M., Khattab, R. A. E. R.& Abdelgalel, M. N. (2018). Association between TSLP gene polymorphism and bronchial asthma in children in Beni Suef Governorate in Egypt. **Comparative Clinical Pathology**, 27(3), 565- 570.
22. Elnady H. G., Foudac E. M., Elsheikha O. M., et.al. (2013). Serum vitamin D level as a predictor of bronchial asthma in Egyptian Children. **Journal of the Arab Society for Medical research**, 8(2), 67.
23. Fernandes SD, Solé D, Camargos P, Andrade CR, Ibiapina CD. Factors associated with asthma expression in adolescents. **Jornal Brasileiro de Pneumologia**. 2018 Jan; 44:12- 7.
24. Ghonem MG. Prevalence of Bronchial Asthma among Primary School Children. **The Egyptian Journal of Hospital Medicine**. 2022 Jul 1;88(1): 3256- 61.
25. Global Initiative for Asthma. **Global strategy for asthma management and prevention** (2016): Available via Error! Hyperlink reference not valid. (Accessed 10 September 2016).
26. Han YY, Lee YL, Guo YL. Indoor environmental risk factors and seasonal variation of childhood asthma. **Pediatric Allergy and Immunology**. 2009 Dec; 20(8): 748- 56.
27. Holst GJ, Pedersen CB, Thygesen M, et.al. Air pollution and family related determinants of asthma onset and persistent wheezing in children: nationwide case- control study. **BMJ**. 2020 Aug 19;370.
28. Horaib YF, ALAmri ES, Al- anazi W, Sharahili EA, Alolayah AM, Alrobian MA. The prevalence of asthma and its related risk factors among the children in Riyadh, Saudi Arabia. **The Egyptian Journal of Hospital Medicine**. 2018 Jan 1;70(6): 965- 73.
29. Horner SD. Examining social determinants of health in childhood asthma management. **Clinical Nurse Specialist**. 2020 Sep 1;34(5): 222- 30.
30. Hossny, E. M., Hasan, Z. E., Allam, M. F.& Mahmoud, E. S. (2009). Analysis of the filed data of a sample of Egyptian children with bronchial asthma. **Egyptian Journal of Pediatric Allergy and Immunology** (The), 7(2).
31. Jiffri, E. H.& Elhawary, N. A. (2011). The impact of common tumor

positive family history of asthma as a major asthma determinant and risk factor. (Valerio et.al, 2010)& (Holst et.al, 2020)& (Horaib et.al, 2018)& (Mao et.al, 2020). Asthmatic children with positive family history of asthma need more hospital admission in comparison with asthmatics without positive family history of asthma. (Valerio et.al, 2010)& (Abd Elmoneim et.al, 2013). Additionally, this study identified the passive smoking as an asthma determinant was high. A study published by Burke et.al was with agreement with this study results which suggested that following measures to protect children from passive smoking is very important (Burke et.al, 2012). This study reported the high risk of illiteracy especially in father as a risk factor of childhood asthma in Egypt. The illiteracy of parents as an asthma determinant and risk factor was significant in other published studies. (Al Ghamdi et.al, 2008)& (Mohamed et.al, 2018)& (Holst et.al, 2020). Asthma prevalence was increased with decreased father education, and asthma severity was increased with decreased maternal and parental education (Cesaroni et.al, 2003). This study reported the protective effect of breast feeding as a risk factor of asthma. These results were with agreement with other studies which reported that the duration of breastfeeding was associated with reduced risk of asthma (a protective factor) for children aged between 5 and 18 years, especially in medium and low- income countries. (Lodge et.al, 2015)& (Dogaru et.al, 2014). The most presenting symptoms of asthma were: wheezing, cough and dyspnea. An Egyptian study which published in 2022 reported the prevalence of wheezing was 87.8%, cough 92.2%, and dyspnea 81.2% which were the most reported clinical presentation of asthma. (Ghonem, 2022). Another study from Poland reported that the prevalence of wheezing among asthmatic infants and preschoolers was 84.1%, dry cough 52.4% and dyspnea 60.3%. (Wypych-Ślusarska et.al, 2022). Prevention of asthma exacerbations is a primary goal of any asthma treatment and management program. This study identified many triggers for asthma excerptions. Some of these triggers were avoidable which by identifying and protecting asthmatic children from such triggers will lead to better asthma control. This study reported many factors such as dust exposure, odors, smoke, physical activity and certain foods. These results agreed with other published studies. (Wypych-Ślusarska et.al, 2022)& (Long, 2018)& (Zhang et.al, 2021)& (DiMango et.al, 2018). Another study from China reported the high prevalence of allergy to home dust mites among asthmatics. (Mao et.al, 2020) Additionally, this study identified cockroach as a risk factor for excerptions of childhood asthma. Another study reported that cockroach exposure was associated with unscheduled emergency department visits. (Rabito et.al, 2021) There was a strong association between cockroach and asthma morbidity as reported by various studies. (LeBeau et.al, 2021)& (Maciag& Phipatanakul, 2022) This study reported that the exposure to common cold/ infections is a risk factor for excerptions of asthma which was with agreement with other studies. (Olenec et.al, 2010)& (Busse et.al, 2010). Contact with animals as a risk factor for excerptions of childhood asthma was identified by our study. Other studies reported the protective and inverse relation between early contact with animals in life and developing asthma. (Pechlivanis& Mutius, 2020)& (Ojwang et.al, 2020). In contrast, another study reported the association between contact with animal indoor and outdoor and asthma (Fernandes et.al, 2018). This study reported that winter season as a risk factor on asthma exacerbations and control in Egypt was obviously higher than. Winter season was the peak for increasing asthma symptoms and asthma exacerbation due to viral infection and cold weather while summer season was the lower as reported by other studies. (Koster et.al, 2011)& (Han et.al, 2009). Finally, this study reported that the total estimated prevlence of asthmatic children on regular treatment of asthma was only (19% with 95% CI= 11.7% to 27.6%) which needs attention. Many factors were contributing in achieving asthma control such as asthma determinants, and presence of other diseases. There were factors related to the physician (following asthma treatment guidelines or not, patient assessment, etc.). Additionally, there were factors related to the patient such as sociodemographic factors, and environmental factors. Adherence to prescribed therapy is low in children and adolescents (30- 70%) (Kaplan& Price, 2020) In China, an epidemiological survey on asthma in children reported that the prevalence of asthmatic children using corticosteroid inhalers was 36.3% in 2010 and increased to 61.7%, in 2013. (Zhou& Hong, 2018).

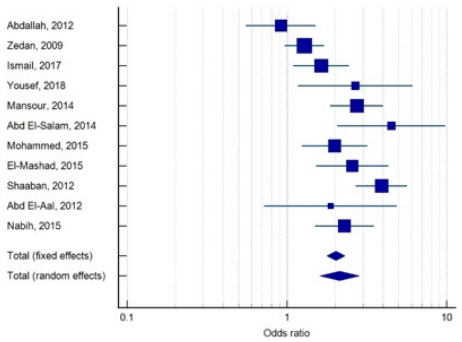
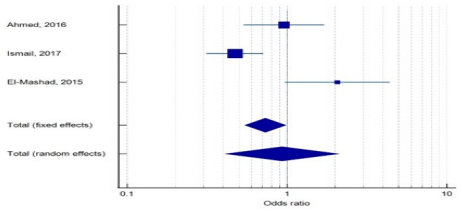
Childhood asthma requires long- term and continuous treatment. Follow up is very important step in asthma management. Conducting national survey for identifying asthma determinants, and developing national programs for asthma diagnosis and treatment is very important. This study strengths included that it identified many asthma determinants, asthma risk factors, presenting symptoms, and highlighted the importance of achieving asthma control through following guidelines, ensuring that asthmatic children were on regular asthma treatment and following up.

Conclusion:

There is a need for large scale research to evaluate low prevalence of asthmatic children on regular treatment and to identify reasons. This study recommended conducting Egyptian national survey for childhood asthma, developing national programs for diagnosis and management of childhood asthma, identifying avoidable asthma exacerbations risk factors, supporting breast feeding as a protective factor.

References:

1. Abd El- Salam, M., Hegazy, A. A., Adawy, Z. R.& Hussein, N. R. (2014). Serum level of Naphthalene and 1, 2 Benz- anthracene and their effect on the immunologic markers of asthma and asthma severity in children Egypt. **Public Health Research**, 4(5), 166- 172.
2. Abd Elmoneim A, Hassan IA, Abd Elnaby A, Abou Elmagd A. Epidemiology and outcome of childhood asthma: a clinical study in an Egyptian university medical centre. **East Mediterr Health J**. 2013 Jun 1;19(6): 520- 6.
3. Abd Elmoneim, A., Hassan, I. A., Abd Elnaby, A.& Abou Elmagd, A. (2013). Epidemiology and outcome of childhood asthma: a clinical

Item	Included Studies	Sample Size	N Of Studies	Random Model Effect	CI	Plotted Chart
Passive Smoking	Abdallah (2012)	5809	11	ODD ratio: 2.136	1.602 to 2.850	
	Zedan (2009)					
	Ismail (2017)					
	Yousef (2018)			Relative risk: 1.474	1.279 to 1.698	
	Mansour (2014)					
	Abd El- Salam (2014)			Relative risk: 0.988	0.762 to 1.282	
	Mohammed (2015)					
	El- Mashad (2015)					
	Shaaban (2012)			Relative risk: 0.867	0.546 to 1.375	
	Abd El- Aal (2012)					
	Nabih (2015)					
Breast Feeding	Ahmed (2016)	1843	3	ODD ratio: 0.931	0.409 to 2.115	
	Ismail (2017)			Relative risk: 0.945	0.780 to 1.145	
	El- Mashad (2015)			Relative risk: 2.690	1.418 to 5.104	

- Asthma Determinants: The pooled odd ratio of urban residency as a risk factor of childhood asthma in Egypt was 1.033 with (95% CI= 0.790 to 1.349) which was higher than rural residency (Odd ratio= 0.968, 95% CI= 0.741 to 1.265). while male gender as a risk factor of childhood asthma in Egypt was (Odd ratio= 1.223 with 95% CI= 1.077 to 1.388) which was obviously higher than female gender (Odd ratio= 0.816, 95% CI= 0.717 to0.927). Positive family history of asthma as a risk factor of childhood asthma in Egypt is very high which was (Odd ratio= 12.4 with 95% CI= 5.789 to 26.565) and the relative risk was (RR= 5.019, with 95% CI= 2.825 to 8.918). Passive smoking as a risk factor of childhood asthma was (Odd ratio= 2.136 with 95% CI= 1.602 to 2.850)= 55.25 to 86.28). Additionally, illiterate father as a risk factor of childhood asthma in Egypt was (Odd ratio= 1.170 with 95% CI= 0.863 to 1.587) which was higher than illiterate mother (Odd ratio= 0.973, 95% CI= 0.685 to 1.382). Low social status as an asthma determinant and risk factor of childhood asthma in Egypt was (Odd ratio= 1.303 with 95% CI= 0.575 to 2.953) which was obviously higher than other social status (Middle and higher social status) (Odd ratio= 0.616, 95% CI= 0.204 to 1.858). Breast feeding as a risk factor of childhood asthma in Egypt was (Odd ratio= 0.931 with 95% CI= 0.409 to 2.115). Furthermore, presence of other allergies as a risk factor of childhood asthma in Egypt was (Odd ratio= 4.503 with 95% CI= 1.806 to 11.226) and the relative risk was (RR= 2.690, with 95% CI= 1.418 to 5.104). This study estimated the total pooled prevalence of having cough as a symptom of asthma among asthmatics children in Egypt was (63.9% with 95% CI= 44.1% to 81.5%), dyspnea (40.4%with 95% CI= 35.7% to 45.2%), and wheezing (80.1% with 95% CI= 34% to 99.9%).
- Asthma Exacerbations Risk Factors: The total pooled prevalence of dust exposure as a risk factor for excerptions of childhood asthma was (70.4% with 95% CI= 60.3% to 79.6%), exposure to certain foods (48.2% with 95% CI= 34.557 to 61.987), odors (32.1% with 95% CI= 24.216 to 40.544), physical activity (57.1% with 95% CI= 41.692 to 71.910), smoke (64.2% with 95% CI= 48.853 to 78.186), cockroach (51.5% with 95% CI= 16.877 to 85.305), common cold/ infections (58.4% with 95% CI= 45.626 to 70.533), contact with animals (30.8% with 95% CI= 22.314 to 39.908). The total pooled prevalence of winter as a risk factor on asthma exacerbations and control in Egypt was (64.1% with 95% CI= 51.6% to 75.7%) which was obviously higher than the prevalence of summer (13.4%, 95% CI= 3.8% to 27.6%).
- Asthmatic children on regular treatment of asthma: The total pooled prevalence of asthmatic children on regular treatment of asthma in Egypt was only (19% with 95% CI= 11.7% to 27.6%).

Discussion:

This study reported that urban residency as a risk factor of asthma in Egypt was higher than rural residency. These results are with agreement with other previously published studies internationally in other countries (Lawson et.al, 2011)& (Sibi et.al, 2002). Urbanization is a risk factors for asthma as a result of air pollution and exposure to chemicals due to industrialization. In contrast, other studies reported higher prevalence of asthma in rural areas (Oluwole et.al, 2018). Air pollution due to burn of dried plants, exposure to animals, lower rate of asthma diagnosis and low socioeconomic status are major determinants of asthma in rural communities. In addition, this study reported the higher risk of male gender than female gender as an asthma determinant. These results are with agreement with other previously published studies. (Kutzora et.al, 2018) (Abd Elmoneim et.al, 2013). The exact reason for the high prevalence of male gender as an asthma determinant is not known but some explanations were reported. This may be due to the higher degree of bronchial lability in male gender and small airway in relation to lung size when compared to female gender. (Abdel- Baseer et.al, 2017)

Controversially, other studies reported higher asthma prevalence in females especially during or after puberty. (Pignataro et.al, 2017)& (Horaib et.al, 2018) Furthermore, this study identified the positive family history of asthma as a determinant of asthma in Egypt was very high. These results were with agreement with other studies which reported

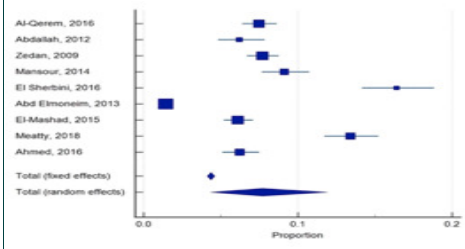
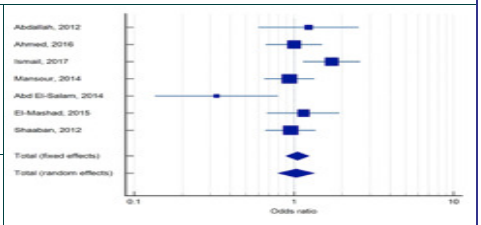
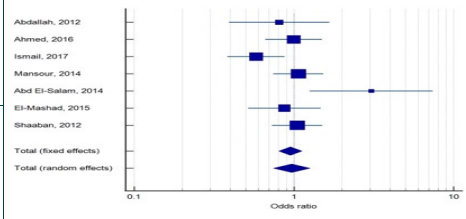
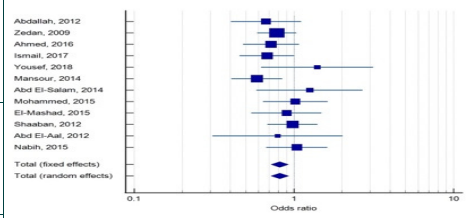
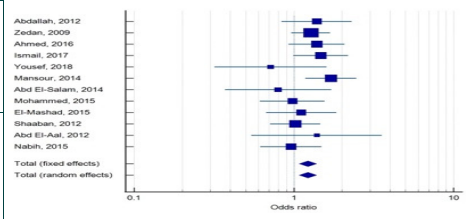
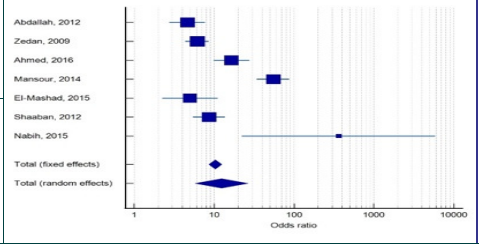
children was (7.19± 3.55).

This is the first meta- analysis to identify the pooled estimate of prevalence of asthma in Egypt from 2000 to 2018 and it is the first to conduct a meta- analysis to identify and get the pooled estimate effect of the asthma risk factors, risk factors for asthma exacerbations, and treatment.

This study identified and analyzed 12 risk factors for asthma, 3 of common asthma symptoms, 8 of risks of asthma execrations, seasonal effect on asthma, and the pooled estimate prevalence of using regular treatment for asthma. Table (1) summarized the characteristics of important identified risk factors and results of the meta- analysis.

- Prevalence Of Asthma: Childhood Asthma prevalence in Egypt was estimated to be: (7.69% with 95% CI= 4.3% to 11.9%), with considerable heterogenicity (I2 inconsistency= 99.15, 95% CI= 98.92 to 99.33, P= 0.0001).

Table (1) characteristics and pooled estimate results of the meta- analysis

Item	Included Studies	Sample Size	N Of Studies	Random Model Effect	CI	Plotted Chart
Asthma Prevalence	Al- Qerem (2016) Abdallah (2012) Zedan (2009) Mansour (2014) El Sherbini (2016) Abd Elmoneim (2013) El- Mashad (2015) Meatty (2018) Ahmed (2016)	26704	9	Prevalence: 7.69%	4.334 to 11.907	
Asthma Determinants And Risk Factors						
Urban	Abdallah (2012) Ahmed (2016) Ismail (2017)	4454	7	ODD Ratio: 1.033 Relative risk: 1.026	0.790 to 1.349 0.913 to 1.153	
Rural	Mansour (2014) Abd El-Salam (2014) El-Mashad (2015) Shaaban (2012)			ODD Ratio: 0.968 Relative risk: 0.997	0.741 to 1.265 0.890 to 1.116	
Female Gender	Abdallah (2012) Zedan (2009) Ahmed (2016) Ismail (2017) Yousef (2018) Mansour (2014)	7352	12	ODD ratio: 0.816 Relative risk: 0.893	0.717 to 0.927 0.832 to 0.960	
Male Gender	Abd El- Salam (2014) Mohammed (2015) El- Mashad (2015) Shaaban (2012) Abd El- Aal (2012) Nabih (2015)			ODD ratio: 1.223 Relative risk: 1.084	1.077 to 1.388 1.018 to 1.154	
Family History Of Asthma	Abdallah (2012) Zedan (2009) Ahmed (2016) Mansour (2014) El- Mashad (2015) Shaaban (2012) Nabih (2015)	6885	7	ODD ratio: 12.401 Relative risk: 5.019	5.789 to 26.565 2.825 to 8.918	

Introduction:

Bronchial Asthma (BA) is a global public health problem, in developed and developing countries which was underdiagnosed and undertreated and most asthma related death communally occurs in low income and lower- middle income countries (WHO, 2010). Asthma is reported to be one of the most common chronic disease in childhood impairing the quality of life and affecting the quality of life of their families and incurring high cost to the health care system and society (Global Strategy for asthma. Management and Prevention, 2016). In Egypt many school- based structures estimated that the prevalence of BA among school children ranged from 6.2% in Assuit city in upper Egypt (Abdualla et.al., 2012) up to 46% in Cairo (Al Dhduh et.al., 2015). Risk Factors related to the development and expression of asthma included host and environment factors. The host risk factors included atopy status and family history of asthma (Subbarao et.al., 2009).

In the susceptible host and a critical time of development, two major environment factors have emerged as the most important in the development, persistence and severity of asthma which are air borne allergens and viral respiratory infections. (D'Amato et.al, 2015).

Meta- analysis is an epidemiological technique for amalgamating, summarizing and reviewing previous quantitative research, by using meta-analysis, a wide variety of questions can be investigated as long as a reasonable body of primary research studies exists. Selected parts of the reported results of primary studies are entered into a database and this meta- data is meta- analyzed in similar ways to work with other data (Higgins et.al., 2003 and Mostafa, 2016).

The aim of this study was conducting meta- analysis study on the prevalence and asthma determinants, risk factors of bronchial asthma in children in Egypt. This is the first study of its nature, as there is no previously published study in this topic.

Methods

Type& Design:

Meta- analysis of published literature about childhood asthma prevalence and risk factors in Egypt.

Literature Search

Three medical bibliographic databases (Medline, Scopus, and Cochrane Library) were searched from 2000 to 2018 according to study protocol. Search keywords were (Egypt, Asthma, Child, Risk factors, Determinants, Prevalence). Search Boolean was adjusted according to searched medical database. Manual search was performed in the references of retrieved papers. Among the studies retrieved in the search, duplicate studies were removed. The selection of studies that meet the inclusion/ exclusion criteria based on the abstracts was done, and then making the final selection of studies based on their full text. The selection of studies that meet the inclusion criteria (Participants were asthmatic children in Egypt, In English language, reporting prevalence and/ or determinants/ risk factors related to asthma, and full text can be accessed was done.

Statistical Analysis:

This study used the random effect model meta- analysis to get the pooled estimate prevalence with 95% Confidence Interval (CI), and odd ration (OR) with 95% CI. This study conducted a relative risk (RR) meta-analysis to get the probability of happening of an event as a pooled RR with 95% CI. Heterogeneity between studies was assessed using the I2 test and Cochrane Q test. A significance threshold of $p< 0.05$ was applied to the heterogeneity (I2). Furthermore, Egger's tests were used to test publication bias when there were at least 10 studies in a pooled analysis. The program (MedCalc statistical software, version 20) was used for all statistical analyses reported in this meta- analysis.

Limitations:

The limitations included the low number of published studies which indexed in selected medical databases such as Scopus and Medline. The sample size in some identified asthma determinants or risk factors was low which affected the generalization of results. Significant heterogenicity between some studies was found.

Results:

- Study Characteristics: PRISMA chart (Figure 1) illustrated the search process of this meta- analysis. The literature search was performed using Medline, Scopus, and Cochrane library databases and 203 articles records were obtained. After removal of duplicates, screening of titles/ abstracts, and applying inclusion/ exclusion criteria 35 articles were selected for full- text review. Finally, 23 articles such as: (Abdallah et.al., 2012)& (Mansour et.al., 2014)& (El- Mashad et.al., 2015)& (Mohamed et.al., 2015)& (Meatty et.al., 2018) were included in this meta- analysis. Of the included 23 studies, 10 were case control studies, and 9 were cross sectional studies, 2 were observational, 1 was longitudinal, and 1 was retrospective study. The most common location of included studies was Cairo= 12 studies. Other Egyptian regions and location were also reported by included studies such as: Sohag, Beni Suef, Assiut, Menofia, Al Qalyobia, Dakahlia, Nile Delta region, Fayoum, and Dimietta.

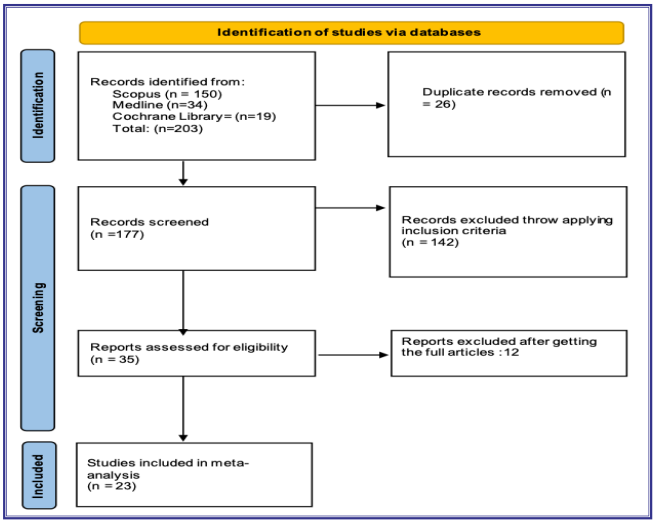


Figure (1) Prisma chart for search results

- Overview of Results: This meta- analysis included 23 studies, with 29854 participants from Egypt. The mean of age of included asthmatic

Bronchial Asthma Management in Children in Egypt and Its Determinants:
A Comprehensive Review and Meta-Analysis

Rasha Mokhtar, Salah E.Mostafa,[1] Hanan A. El Gamal [2]

[1]Professor of Preventive Medicine and Epidemiology, Medical Studies Department for Children, Faculty of Postgraduate Childhood Studies- Ain Shams University

[2]Professor of Pediatrics, Medical Studies Department for Children, Faculty of Postgraduate Childhood Studies, Ain Shams University

رشا مختار سعيد

أ.د. محمد صلاح الدين مصطفي،[١] أ.د. حنان عبد الله الجمل[٢]

[١]أستاذ الصحة العامة والوبائيات قسم الدراسات الطبية للأطفال

كلية الدراسات العليا للطفولة جامعة عين شمس

[٢]استاذ طب الاطفال قسم الدراسات الطبية للأطفال

كلية الدراسات العليا للطفولة جامعة عين شمس

Summary

Background: Bronchial Asthma (BA) is a global public health problem, in developed and developing countries which was underdiagnosed and undertreated. Risk Factors related to the development and expression of asthma included: environmental and host factors. Such as: atopy status and family history of asthma.

Aim: conducting meta- analysis study on the prevalence and asthma determinants, risk factor in children as there is no previous studies about this.

Methods: Three medical databases (Medline, Scopus, and Cochrane Library) were searched from 2000 to 2018 according to study protocol. Among the retrieved articles in the search, duplicate studies were removed. The selection of studies that meet the inclusion criteria Participants were asthmatic children in Egypt, In English language, reporting prevalence and/ or determinants/ risk factors related to asthma, and full text can be accessed.

Results: Urban residency as a risk factor was higher than rural (1.033 vs 0.968), male gender had higher risk than female gender (1.223 vs 0.816). Furthermore, positive family history of asthma as an asthma determinant was very high (Odd ratio= 12.4). Passive smoking, illiteracy, low social status, presence of other allergies were positive asthma determinants while breast feeding was a protective factor. The percentage of asthmatic children on regular asthma treatment was estimated to be 19%.

Conclusion: There is a need for large scale research to evaluate these results. This study recommended conducting Egyptian national survey for childhood asthma, and supporting breast feeding as a protective factor.

Keywords: Egypt, Asthma, Childhood, Risks, meta- analysis.

إدارة الربو القصبى لدي الأطفال فى مصر ومحدداته: تحليل ميتا البعدى ومراجعة منظمة للأبحاث

مقدمة: يعتبر الربو الشعبي مشكلة صحية عالمية في الدول المتقدمة والدول النامية وهناك قصور في تشخيص وعلاج هذا المرض. كما أن عوامل الخطر المؤدية للإصابة بهذا المرض تشمل عوامل بيئية وعوامل تعود للعائل منها الإصابة بأمراض الحساسية والتاريخ المرضي الاسري الإيجابي للربو.

الهدف: هو إجراء دراسة تحليلية للنسبة المئوية ومحددات وعوامل خطر الإصابة بالربو الشعبي عند الأطفال في مصر ولم ينشر سابقا مثل هذه الدراسة.

المنهج: تم البحث في ثلاث قواعد بيانات طبية معتبرة في الفترة من ٢٠٠٠ إلى ٢٠١٨ وفقا لبروتوكول الدراسة. تم استبعاد الدراسات المكررة والتي كانت خارج نطاق هذه الدراسة كما تم تضمين الدراسات التي تفي بالمعايير التالية: المشاركون في الدراسة من الأطفال المصابين بالربو، اما الدراسات المنشورة باللغة الإنجليزية، تحوي الدراسة معلومات عن النسبة المئوية/ المحددات/ عوامل الخطر المتعلقة بالربو عند الأطفال المصريين، ويمكن الوصول إلى النص الكامل للدراسة.

النتائج: كانت نتائج البحث الأولية تحتوي على ٢٠٣ من الدراسات المنشورة. وتم تضمين ٢٣ دراسة من بينهم في هذه الدراسة التحليلية، والتي تضمنت ٢٩٨٥٤ مشاركا. كانت الإقامة في الأماكن الحضرية كعامل خطر للإصابة بالربو أعلى من الريف (١,٠٣٣ مقابل ٠,٩٦٨)، وكان جنس الذكور كعامل خطر أعلى من الإناث (١,٢٢٣ مقابل ٠,٨١٦). علاوة على ذلك، كان التاريخ المرضي العائلي الإيجابي للربو كمحدد للربو مرتفعا جدا (النسبة الفردية= ١٢,٤). كما كان التدخين السلبي، والأمية، والحالة الاجتماعية المنخفضة، ووجود أمراض الحساسية الأخرى عوامل خطر إيجابية للربو، أما الرضاعة الطبيعية فكانت عاملا وقائيا للربو. وقدرت هذه الدراسة نسبة الأطفال المصابين بالربو الخاضعين للعلاج المنتظم بـ١٩%.

خاتمة: يجب الانتباه الى النسبة المنخفضة من الأطفال المصابين بالربو الذين يخضعون للعلاج المنتظم للربو مما يشير إلى أن هناك حاجة لإجراء بحث واسع النطاق لتقييم هذه النتيجة وتحديد الأسباب. كما أوصت هذه الدراسة بإجراء مسح قومي مصري خاص بمرض الربو عند الأطفال، ودعم الرضاعة الطبيعية كعامل من عوامل الحماية.

الكلمات المفتاحية: مصر، الربو، الأطفال، عوامل الخطر، دراسة تحليلية.

Accepted at: 7/ 11/ 2022